AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application.

LISTING OF CLAIMS

1. (Currently Amended) ~~A~~ The vacuum pump arrangement according to claim 37 wherein the multi-stage centrifugal compressor mechanism ~~comprising~~ comprises a housing~~, a~~ within which the drive shaft is rotatably mounted ~~within the housing~~, a plurality of fixed members disposed within the housing and defining a plurality of interconnected fluid chambers, the rotor elements of the compressor mechanism comprising a plurality of impellers mounted on the drive shaft and disposed relative to the fixed members such that each impeller delivers compressed fluid to a respective fluid chamber, the compressor mechanism further comprising a bypass channel extending between two of the fluid chambers to enable fluid to pass between those chambers without compression, and means for controlling the flow of fluid through the bypass channel.

2. (Currently Amended) A The ~~mechanism~~ vacuum pump arrangement according to ~~C~~claim 1~~,~~ wherein the control means is arranged to open the bypass channel under the influence of a pressure difference between said two of the fluid chambers.

3. (Currently Amended) A The ~~mechanism~~ vacuum pump arrangement according to ~~C~~claim 1 ~~or Claim 2,~~ wherein the control means is arranged to open the bypass channel when the pressure in an upstream one of said two of the fluid chambers is greater than the pressure in a downstream one of said two of the fluid chambers.

4. (Currently Amended) A The ~~mechanism~~ vacuum pump arrangement according to ~~any preceding claim,~~ claim 1 wherein said two of the fluid chambers are adjacent fluid chambers of the compressor mechanism.

5. (Currently Amended) ~~A~~The ~~mechanism~~ vacuum pump arrangement according to ~~C~~claim 4~~,~~ wherein the bypass channel passes through the fixed member located between the adjacent fluid chambers.

6. (Currently Amended) ~~A~~The ~~mechanism~~ vacuum pump arrangement according to ~~any preceding claim,~~ claim 1 wherein the control means comprises valve means.

7. (Currently Amended) ~~A~~The ~~mechanism~~ vacuum pump arrangement according to ~~C~~claim 6~~,~~ wherein the valve means comprises a valve member displaceable in use between a closed position and an open position by pressurised fluid.

8. (Currently Amended) ~~A~~The ~~mechanism~~ vacuum pump arrangement according to ~~C~~claim 7~~,~~ wherein the valve member comprises a flap valve.

9. (Currently Amended) ~~A~~The ~~mechanism~~ vacuum pump arrangement according to ~~any of Claims 6 to 8,~~ claim 6 wherein the valve means is located within a fluid chamber.

10. (Currently Amended) ~~A~~The ~~mechanism~~ vacuum pump arrangement according to ~~any preceding claim,~~ claim 1 comprising, for each fluid chamber, a respective bypass channel extending between that fluid chamber and the adjacent downstream fluid chamber, and means for controlling the flow of fluid through each bypass channel.

11. (Currently Amended) ~~A~~The ~~mechanism~~ vacuum pump arrangement according to ~~any preceding claim,~~ claim 1 further comprising surge control means for controlling surge within the multi-stage centrifugal compressor mechanism.

12. (deleted)

13. (Currently Amended) ~~A~~The ~~mechanism~~ vacuum pump arrangement according to ~~C~~claim 11 ~~or Claim 12,~~ wherein the surge control means comprises means for conveying a stream of fluid to each fluid chamber, and means for controlling the rate of flow of the fluid stream into each fluid chamber.

14. (Currently Amended) ~~A~~The ~~mechanism~~ vacuum pump arrangement according to ~~C~~claim 13~~,~~ wherein the conveying means is arranged to convey a stream of purge gas to each fluid chamber.

15. (Currently Amended) ~~A~~The ~~mechanism~~ vacuum pump arrangement according to ~~C~~claim 14~~,~~ wherein the purge gas comprises air or an inert gas.

16. (Currently Amended) ~~A~~The ~~mechanism~~ vacuum pump arrangement according to ~~C~~claim 13~~,~~ wherein the conveying means is arranged to convey a stream of compressed fluid to each fluid chamber from a downstream fluid chamber.

17. (Currently Amended) ~~A~~The ~~mechanism~~ vacuum pump arrangement according to ~~C~~claim 16~~,~~ wherein the conveying means comprises, for each fluid chamber, a fluid passage extending between that fluid chamber and the adjacent downstream fluid chamber.

18. (Currently Amended) ~~A~~The ~~mechanism~~ vacuum pump arrangement according to ~~C~~claim 17~~,~~ wherein the fluid passages are co-axial.

19. (Currently Amended) ~~A~~The ~~mechanism~~ vacuum pump arrangement according to ~~C~~claim 17 ~~or Claim 18,~~ wherein each fluid passage passes through a respective fixed member.

20. (Currently Amended) ~~A~~The ~~mechanism~~ vacuum pump arrangement according to ~~any of Claims 16 to 19,~~ claim 16 wherein the control means comprises valve means in fluid communication with said conveying means.

21. (Currently Amended) ~~A~~The ~~mechanism~~ vacuum pump arrangement according to ~~C~~claim 20~~,~~ wherein the valve means comprises a spool valve.

22. (Currently Amended) ~~A~~The ~~mechanism~~ vacuum pump arrangement according to ~~any preceding claim,~~ claim 1 wherein each fixed member comprises a disc mounted on, or integral with, a respective part of the housing.

23. (Currently Amended) ~~A~~The ~~mechanism~~ vacuum pump arrangement according to ~~any preceding claim,~~ claim 1 comprising means for cooling the fixed members.

24. (Currently Amended) ~~A~~The ~~mechanism~~ vacuum pump arrangement according to ~~C~~claim 23~~,~~ wherein the cooling means comprises a plurality of cooling fins located on one side of each fixed member.

25. (Currently Amended) ~~A~~The ~~mechanism~~ vacuum pump arrangement according to ~~C~~claim 23 ~~or Claim 24,~~ wherein the cooling means comprises means for supplying a flow of coolant to each fixed member.

26. (Currently Amended) ~~A~~The ~~mechanism~~ vacuum pump arrangement according to ~~any preceding claim,~~claim 1 comprising a cooling jacket extending about at least part of the multi-stage centrifugal compressor mechanism.

27. (deleted)

28. (deleted)

29. (deleted)

30. (deleted)

31. (deleted)

32. (Original) A vacuum pump comprising a multi-stage centrifugal compressor mechanism comprising a plurality of rotor elements mounted on a rotatably mounted drive shaft, and, upstream therefrom, a molecular drag mechanism comprising at least one rotor element mounted on the drive shaft, wherein the at least one rotor element of the molecular drag mechanism at least partially surrounds a motor for rotating the drive shaft.

33. (Currently Amended) ~~A~~The vacuum pump according to ~~any of Claims 30 to~~ claim 32~~,~~ wherein said at least one rotor element of the molecular drag pumping mechanism comprises a cylinder mounted for rotary movement with the rotor elements of the compressor mechanism.

34. (Currently Amended) ~~A~~The vacuum pump according to ~~any of Claims 27 to 33,~~ claim 32 comprising means for monitoring the temperature of the pump, and means for controlling the speed of rotation of the shaft in dependence on the monitored temperature.

35. (deleted)

36. (deleted)

37. (Currently Amended) A vacuum pumping arrangement comprising a ~~booster~~ vacuum pump in series with a backing pump, wherein the ~~booster pump comprises a~~ vacuum pump ~~according to any of Claims 27 to 34.~~comprises a multi-stage centrifugal compressor mechanism comprising a plurality of rotor elements mounted on a rotatably mounted drive shaft, and, upstream therefrom, a molecular drag mechanism comprising at least one rotor element mounted on the drive shaft, wherein the at least one rotor element of the molecular drag mechanism at least partially surrounds a motor for rotating the drive shaft.

38. (deleted)

39. (deleted)

40. (Currently Amended) ~~A~~The vacuum pumping arrangement according to ~~any of Claims 37 to 39,~~ claim 37 comprising a bypass conduit connected between an exhaust from the booster pump and an exhaust from the backing pump, and means for controlling the flow of fluid through the bypass conduit.

41. (New) A vacuum pump according to claim 37 wherein the molecular drag mechanism defines a plurality of flow channels that each receive fluid from a pump inlet and exhaust pumped fluid to a common exhaust port.

42. (New) A vacuum pump according to claim 37 wherein the molecular drag mechanism is a multi-stage molecular drag mechanism.

43. (New) A vacuum pump according to claim 42 wherein the stages of the drag mechanism are arranged in parallel.